

Appl. No. : **10/633,826**
Filed : **August 4, 2003**

REMARKS

Claims 1 and 5 have been amended to clarify the invention. Support for the amendments can be found in Fig. 1, for example. Claim 6 has been amended to correct minor informalities. The drawing has been amended to comply with the U.S. practice. The amendments do not raise the addition of new matter to the application. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

Drawing Objection

Fig. 4 has been amended by adding a legend --Prior Art-- to designate that the illustrated is old, thereby obviating the objection. It is respectfully requested that the objection be withdrawn.

Claim Objection

Claims 5-8 are objected to because of the informalities set forth in the office action. The claims have been amended to correct the informalities in accordance with the Examiner's suggestion, thereby obviating the objection. It is respectfully requested that the objection be withdrawn.

Rejection of Claims 1, 2 and 4 Under 35 U.S.C. § 102

Claims 1, 2 and 4 are rejected under 35 U.S.C. 102 (b) as being anticipated by Kosaka et al. (USP 4,059,415). Claim 1 has been amended for clarification. Claims 2 and 4 are dependent on Claim 1. The claims could not be anticipated by Kosaka et al. as explained below.

The claimed invention relates to a non-premixing type reactor (Emphasis added). In contrast, Kosaka et al. discloses a premixing type reactor having a separate reactor (20). These reactors each have different structure, mechanism and objectives. That is, in the premixing type reactor, an oxidizing agent and a raw material are premixed in a separate reactor outside a main reactor vessel. Kosaka et al. discloses a venturi structure to premix the agent and material rapidly and uniformly (see column 4, second paragraph). When the oxidizing agent and the raw material are premixed, an explosive mixture may be formed, or local combustion in premixing region may generate flame propagation, which results in heat or high temperature corrosion. In contrast, in a

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non-premixing type reactor, such premixture is not formed and the above phenomena do not exist. However, in a non-premixing type reactor, there was a problem that a high temperature zone was generated in the vicinity of a burner nozzle. The claimed invention prevents the generation of the high temperature zone by employing the specific structure recited in Claim 1.

Claim 1 has been amended to recite “a single reactor vessel” to clearly distinguish from Kosaka et al. which has a reaction chamber (10) and a separate reactor (20) to premix an oxidizing agent and a raw material (see column 3, lines 66-67 and Fig. 1). The claimed invention does not have a separate reactor because of a non-premixing type reactor.

Claim 1 has been also amended to recite “said pipes separately opening into the vessel”. As shown in Fig. 1 of the present application, an oxidizing agent feed pipe (21) and a carbon-containing raw material feed pipe (11) separately open into the vessel (4). In contrast, in Kosaka et al., an oxidizing agent feed pipe (40) and a carbon-containing raw material feed pipe (50) do not separately open into the vessel (10) (see Fig. 3, for example). The claimed invention is entirely different from Kosaka et al.

Kosaka et al. fails to disclose every element of the claimed invention, and withdrawal of the rejection under 35 U.S.C. § 102 is respectfully requested.

Rejection of Claims 5 and 6 Under 35 U.S.C. § 102

Claims 5 and 6 are rejected under 35 U.S.C. 102 (b) as being anticipated by Heck et al. (USP 4,844,837). Claim 5 has been amended for clarification and Claim 6 is dependent on Claim 5. The claims could not be anticipated by Heck et al. as explained below.

Heck et al. discloses a premixing type reactor as well as Kosaka et al. In Heck et al., an oxidizing agent and a carbon-containing raw material are premixed in a mixer (14) outside a reactor vessel (24). As explained above, a non-premixing type reactor is essentially different from a premixing type reactor.

Claim 5 has been amended to recite “the oxidizing agent flowing direction and the carbon-containing raw material flowing direction intersect with each other inside the vessel to contact the oxidizing agent and the carbon-containing raw material”. In contrast, in Heck et al. employing the premixing type reactor, the oxidizing agent flowing direction and the carbon-containing raw material flowing direction intersect with each other in the mixer outside the vessel.

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Claim 5 has been also amended to recite “feeding a carbon-containing raw material in a carbon-containing raw material flowing direction into the vessel separately from the oxidizing agent to partially oxidize the carbon-containing raw material”. In contrast, in Heck et al., since the oxidizing agent and the carbon-containing raw material are premixed in the mixer (14) outside the reactor vessel (24), the carbon-containing raw material is not fed into the vessel (24) separately from the oxidizing agent.

Heck et al. fails to disclose every element of the claimed invention, and withdrawal of the rejection under 35 U.S.C. § 102 is respectfully requested.

Rejection of Claim 8 Under 35 U.S.C. § 102 or §103

Claim 8 is rejected under 35 U.S.C. 102 (b) as being anticipated by or, in the alternative, under 35 U.S.C. 103 (a) as obvious over Heck et al.

Claim 8 dependent on Claim 5, recites the above distinct features of Claim 5 and an additional feature. At least for the reason above, Claim 8 could not be anticipated by or obvious over Heck et al. It is respectfully requested that the rejection be withdrawn.

Rejection of Claims 3 and 7 Under 35 U.S.C. § 103

Claim 3 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Kosaka et al. Claim 7 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Heck et al.

Claim 3 dependent on Claim 1, recites the above distinct features of Claim 1 and an additional feature. Claim 7 dependent on Claim 5, recites the above distinct features of Claim 5 and an additional feature. At least for the reason above, Claims 3 and 7 are patentably distinguished over the prior art.

Further, while the Examiner asserts that a change in size is generally recognized as being within the level of ordinary skill in the art, in the present case, the limitations of the formula as recited in Claim 3 or 7 provide that the carbon-containing raw material and the oxidizing agent are mixed together in a specific manner that prevents the generation of a high temperature zone in the vicinity of the burner nozzle, and the partial oxidation reaction may also proceed stably and uniformly (see page 6, lines 8-12 of the specification).

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Furthermore, in order to obtain the parameter ranges recited in Claim 3 or 7, even a person skilled in the art has to conduct a three dimensional Computational Fluid Dynamic (CFD) analysis with a clear purpose of effectively using diffusive mixing on surface of potential cores formed by jets to accelerate the partial oxidation reaction uniformly. Neither Kosaka et al. nor Heck et al. refers even to potential cores.

In view of the foregoing, Claims 3 and 7 could not be obvious over the references. It is respectfully requested that the rejections be withdrawn.

CONCLUSION

In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

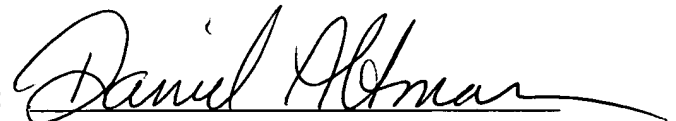
Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: November 22, 2004

By:



Daniel E. Altman

Registration No. 34,115

Attorney of Record

Customer No. 20,995

(949) 760-0404

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AMENDMENTS TO THE DRAWINGS

As stated below, Applicant has requested to amend Figure 4 to add a legend --Prior Art-- to designate that the illustrated is old, as shown in the Replacement Sheet.

REQUEST FOR APPROVAL OF DRAWING CHANGES

The amendment to the drawing requested herein is for adding a legend --Prior Art-- to designate that the illustrated is old. The amendment does not raise any new matter, and approval of this amendment is respectfully requested.